ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's	)	CC Docket No. 92-166
Rules to Establish Rules and	)	
Policies Pertaining to a Mobile	)	
Satellite Service in the	)	
1610-1626.5/2483.5-2500 MHz	)	
Frequency Bands	)	

REPLY COMMENTS OF AERONAUTICAL RADIO, INC., AND THE AIR TRANSPORT ASSOCIATION OF AMERICA

Aeronautical Radio, Inc. (ARINC) and the Air Transport Association of America (ATA), by their attorneys, hereby reply to comments submitted in response to the Commission's Notice of Proposed Rulemaking in this proceeding.

The main interest of ARINC and ATA in this proceeding is to protect the critical safety-of-life aeronautical radionavigation services that operate in the band 1559-1626.5 MHz while promoting the early introduction of the proposed mobile satellite service (MSS). Representatives of the MSS applicants in this proceeding, AMSC, Constellation Communications, Ellipsat, Loral/Qualcomm, TRW, and Motorola, participated on the United States Delegation to the 1992 World Administrative Radio Conference, at which Note 731E to the International Table of Frequency Allocations was adopted.[1] These companies are thus fully aware of the need to protect the Global Orbiting Navigation Satellite System (GLONASS) of the

[1] International Telecommunication Union Radio Regulations (ITU RR) 731E.

Russian Federation, as well as the Global Positioning System (GPS) of the United States, from harmful interference caused by MSS mobile units. The Federal Aviation Administration (FAA) and Rockwell International submitted comments containing interference analyses that support the need to protect GLONASS, as well as GPS, and establish the level of protection required.

This reply principally addresses the opening round comments of the MSS applicants[2] and demonstrates that:

- GLONASS is a real navigation system that will be used in the United States and should be protected under international law and in the public interest;
- Both GLONASS and GPS should receive the level of protection from out-of-band signals from MSS mobiles that was agreed to during the negotiated rulemaking for GPS;
- The Russian Federation appears willing to move GLONASS to operate on frequencies below 1610 MHz; if the MSS applicants wish earlier access to the band then they should consider contributing to the cost of moving the incumbent user (GLONASS) to the new frequencies.

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[2] AMSC Subsidiary Corporation, an MSS applicant in this proceeding, submitted comments that agree with ARINC/ATA that shared use of the aeronautical radionavigation band by MSS mobiles would be difficult. AMSC Comments at 33-34.

1. GLONASS should be protected in the United States.

The MSS applicants question whether there will be an operational GLONASS and whether it will be used in the United States. The simple answer to both questions is yes. GLONASS is an important part of the worldwide Global Navigation Satellite System (GNSS) being implemented by the International Civil Aviation Organization (ICAO) and should be protected from harmful interference in the United States.

The Russian Federation is proceeding to deploy GLONASS. GLONASS Information Bulletin 1/94 issued by the Russian Scientific Information Coordination Center of the Military Space Forces states:

> By order of the President of the Russian Federation of 24 September, 1993, adopted for regular use of the Armed Forces of the Russian Federation was Global Navigation Satellite System GLONASS, which works in the interest of civilian and military users.

Three GLONASS satellites were launched by Russia on April 11, 1994, and three more are scheduled to be launched this summer. The Russian Federation continues to represent to the world that it will make available an operational GLONASS system for international civil aviation.

In the United States, the FAA has urged the FCC to adopt rules that would protect GLONASS from interference during the transition of GLONASS to frequencies

below 1610 MHz.[3] The FAA is scheduled to meet with the Russian Federation in July 1994 to discuss the development of common receiver standards for GPS/GLONASS.

At the FAA's request, RTCA, Inc., formed Task Force One to plan for implementation of GNSS. The consensus of U.S. Civil Aviation and the FAA developed by RTCA was that:

> The FAA should base GNSS initial operational implementation on the use of the U.S. GPS national resource and appropriate augmentations. The early system configuration should be expanded to accommodate the Russian GLONASS and other satellites and augmentation as they become available.[4]

The RTCA Task Force viewed the use of GLONASS in the United States as a potential augmentation to the use of GPS in the United States. For example, GLONASS can be used in conjunction with GPS to ensure that sufficient satellites are always in view to provide aircraft with the ability to monitor the integrity of the GNSS navigation information.[5] Thus, GLONASS is an important component of domestic U.S. radionavigation planning.

ARINC demonstrated during the Negotiated Rulemaking that, in order to protect GNSS during approach, landing, and taxiing, the e.i.r.p. density from an MSS mobile

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[3] See Comments of FAA (May 5, 1994).

[4] RTCA, Task Force Report on the Global Navigation Satellite System (GNSS) Transition and Implementation Strategy 2 (September 1992).

[5] Id. at 69, 71.

should be limited to -78.5 dB(W/MHz).[6] Moreover, even to protect aircraft navigating by GLONASS at a cruising altitude of 33,000 feet (10,000 meters), the MSS mobile units cannot exceed a power density of -30.4 dB (W/MHz).[7] Authorization of higher power operations before GLONASS can change frequencies would violate ITU RR 731E which plainly states that "[s]tations of the mobile satellite service shall not cause harmful interference to, or claim protection from, stations in the aeronautical radionavigation service . . . ."[8]

GLONASS is also critical to the establishment of the worldwide GNSS. The international community is reluctant to become solely dependent upon the United States Department of Defense for GPS. The availability of an alternative in GLONASS will complement GPS, increasing its acceptability internationally, thereby fostering the development of more accurate and broadly based GNSS. On the other hand, if the United States ignores its obligation to protect GLONASS over the United States, it can expect similar treatment of GPS in other parts of the world.

Representatives of the Russian Federation have indicated their willingness to move GLONASS to frequencies below 1610 MHz to permit MSS mobiles to operate at

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[6] See Report of the MSS Above 1 GHz Negotiated Rulemaking Committee 17 (April 6, 1993)("Negotiated Rulemaking Report").

[7] Id.

[8] Loral/Qualcomm goes so far as to request that the FCC unilaterally amend ITU RR 731E by omitting the final sentence in that footnote when the Commission amends Section 2.106 of its Rules to reflect the text of the ITU regulation. Loral/Qualcomm Comments at 67-68 (May 5, 1994).

higher powers, but no firm date has been set for that transition. Until we have achieved an agreed upon date to change frequencies for GLONASS, the FCC's proposed rules properly protect GLONASS from interference up to a frequency of 1616 MHz.

2. GLONASS and GPS should be protected from out-of-band emissions.

Loral/Qualcomm suggests that the FCC abandon the out-of-band protection adopted in the Negotiated Rulemaking of -70 dB (W/MHz) in favor of a -50 dB (W/MHz) criterion.[9] Loral/Qualcomm would thus increase the out-of-band radiation from its mobiles by 20 dB directly in the channel used by GPS. Loral/Qualcomm offers no basis for this suggestion, which is contrary to the conclusions reached during the Negotiated Rulemaking and the calculations submitted by the FAA.[10] ITU RR 953 requires the FCC to take "special measures to ensure freedom from harmful interference" to the radionavigation service. As agreed during the Negotiated Rulemaking, the out-of-band power of MSS mobiles should be limited to no more than -70 dB (W/MHz) wideband and no more than -80 dBW narrowband over the channel

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[9] See Loral/Qualcomm Comments at 65.

[10] See FAA Comments at 4. The FAA shows that to protect GLONASS, the out-of-band power should actually be less than -71 dB(W/MHz).

used by GPS.[11] In order to comply with ITU RR 953, these same limits on out-of-band signals from MSS mobiles should apply to the channels used by GLONASS once it has moved to frequencies below 1610 MHz.

3. In order to facilitate the frequency change for GLONASS, the MSS applicants could offer to contribute to the cost.

As the Commission is aware, imposing a frequency change on incumbent users presents both technical and economic challenges. The technical challenge to Russia is to redesign the GLONASS satellites and receivers to operate on slightly lower frequencies and to implement an antipodal frequency plan. This the Russian Federation appears to be both capable and willing to do.

The second challenge is financial. There will be a significant cost involved in changing the frequencies. The Commission, when it decided that the new Personal Communications Service should supplant 2 GHz microwave systems, recognized that the incumbent users of spectrum should be compensated when forced to move to a new frequency band.[12] The new user will benefit from the change in frequency and should, therefore, consider sharing in the cost of the relocation. In the case of GLONASS, the incumbent user has invested heavily in the system that is consistent with the International Table of Frequency Allocations, and is in the midst of deploying

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[11] Negotiated Rulemaking Report at 45.

[12] See Emerging Technologies, First Report and Order and Third Notice of Proposed Rulemaking, 7 F.C.C. Rcd. 6886, 6890 (1993).

satellites. The MSS applicants could explore with the Russian Federation whether a more aggressive timetable could be established were they to make some financial contribution to move the operations.

* * *

The deliberations of the Negotiated Rulemaking and the Comments of the FAA and Rockwell clearly demonstrate the need to protect GLONASS from co-channel interference until it can be shifted to new frequencies and the need to protect both GPS and GLONASS from out-of-band interference from MSS systems. The FCC should adopt suitable limits to protect both systems based on the Report of the Negotiated Rulemaking and the Comments of the FAA and Rockwell. The Russian Federation is

apparently willing to ease the burden of co-channel protection for GLONASS by changing frequencies, but to the extent that the MSS applicants wish to hasten the transition, they should consider contributing to the cost of the changes.

Respectfully submitted,

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June 20, 1994

CERTIFICATE OF SERVICE

I, Phyllis C. Hall, a secretary at the law offices of Wiley, Rein & Fielding, hereby certify that on this 20th day of June, 1994, I caused copies of the foregoing "Reply Comments of Aeronautical Radio, Inc., and the Air Transport Association of America" to be mailed via first-class postage prepaid mail to the following:

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